UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/715,973	11/16/2000	Rao V. Annapragada	VTI1P304A	8828

7590 12/19/2002

Martine Penilla & Kim LLP
710 Lakeway Drive Suite 170
Sunnyvale, CA 94085

EXAMINER	
CRUZ, LOURDES C	
ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 12/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/715,973	ANNAPRAGADA, RAO V.	
	Examiner	Art Unit	
	Lourdes C. Cruz	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 9-17-02 .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 21-35 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 21-35 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on 17 September 2002 is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 21-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsuura (US 6034418).

Matsuura teaches a first conductive pattern element 102, a layer of silicon material 103 having a via hole – unlabeled—defining a path to the first conductive pattern element. Matsuura also teaches a wall surface on the via hole having – see col. 4, lines 45+-- a hydrophobic material, a substrate 101, a TiN layer 105, a fill material 106 (layer inside the via), and a second conductive pattern element (metal portion on the fill).

See that the cited prior art teaches a hydrophobic material (SiF). Claims 22-25,28-35 recite or depend upon a claim that recites a product by process. See that Matsuura teaches all the structural limitations as discussed above. However, the claims recite product by process limitations such as:

- A SOG layer
- A hydrophobic material being the result of a claimed reaction

Such limitations do not patentably distinguish the prior art from that which is being claimed.

A "product by process" claim is directed to the product per se, no matter how actually made, In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Marosi et al, 218 USPQ 289; and particularly In re Thorpe, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

Claims 21-23, 25-29 and 31-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Asahina et al. (US 6144097).

Asahina teaches a semiconductor via structure comprising:

- A first conductive pattern element 19
- A layer of SOG material 30 (See col. 5 lines 60+) having a via hole 32 – Fig. 1B—
- Asahina's shown via hole defines a path to 19 – first conductive pattern element—
- The via hole has a wall surface –unlabeled-- inherently having a hydrophobic material layer SiF due to the etching process with NH_4F –See Col. 5, lines 10+-- which is similar to Applicant's process
- See that NH_4F is a halogen compound
- Also see that 11 is a substrate

Asahina also teaches:

- Titanium Nitride (33) in substantially continuous contact with the hydrophobic layer –Claims 25,31,34—
- A fill material (34,35) –Claims 26,32,35—
- A second conductive pattern element (36) in conductive contact with the fill material, the TiN layer, and the first conductive layer – Claim 27—

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 24 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asahina et al. in view of Sugiura et al. (US 5557147).

Asahina teaches all the claimed limitations as discussed above. However, Asahina fails to specifically teach CCl_4 as a suitable material for the etching halogen compound. See that Sugiura et al (Cols. 62-63) specifically mention CCl_4 as a suitable halogen compound for the purpose of etching a via and improving the production yield. Therefore, it would have been obvious to incorporate the halogen compound taught by Sugiura to the teachings of Asahina in order to etch and improve production yield.

Response to Arguments

Applicant's arguments filed 9-17-02 have been fully considered but they are not persuasive. Applicant argues:

- There is no discussion of SiF as a compound "rather SiF bonds are described..."
- Matsamura's SiOF can permit easy infiltration of moisture preventing it from being a hydrophobic layer

- SOG is not a product by process limitation
- "there is no teaching of SOG used as a substitute for BPSG
- the use of a hydrophobic material is not inherent

Arguments submitted in the remarks are not persuasive since:

- Although claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns,* 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Moreover, the SiF disclosed In col. 3, lines 55+ of the prior art have not been distinguished in the claims from that in the Application
- "hydrophobic" has not been defined in the claims in a way that it will differentiate the invention from that of the prior art. See that no degree of impermeability or any degree of as to what extend the claimed layer is "hydrophobic" has not been stated in the claims. Moreover, labels, statements of intended use, or functional language such as we have here in "hydrophibic" does not structurally distinguish the claim over the prior art which shows a structure that may likewise be labeled, used or fuction as a hydrophobic layer. See *In re Pearson* 181 USPQ 641, Ex parte Minks 169 USPQ 120, and *In re Swinwhart* 169 USPQ 226.

- See page 278 (4. +), which has been incorporated herein by reference, wherein SOG is described as a process. Therefore, the rejection above is deemed proper.
- See that while applicant argues that there is no SOG layer teaching, the examiner is interpreting such term as a process
- The use of hydrophobic is inherent since, but not only because, hydrophobic is a label and no degree as to to what extend the claimed material is hydrophobic is claimed (See above).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lourdes C. Cruz whose telephone number is 703-306-5691. The examiner can normally be reached on M-F 10:00- 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Lourdes C. Cruz
Examiner
Art Unit 2815

Lourdes Cruz
December 14, 2002

KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800